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S1	84	(catmull with clark)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/11/07 14:27
S2	72	(catmull adj clark)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/11/07 14:40
S3	62	S2 and vertex	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/11/07 14:40
S4	28	S3 and extraordinary	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/11/07 14:40



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1 [High quality computer animation](#)



Edwin E. Catmull

July 1977

ACM SIGGRAPH Computer Graphics , Proceedings of the 4th annual conference on Computer graphics and interactive techniques SIGGRAPH '77, Volume 11 Issue 2

Publisher: ACM Press

Full text available: [pdf\(7.19 KB\)](#)

Additional Information: [full citation](#)

2 [Educating the digital artist for the entertainment industry \(panel\): the collision of academia and business](#)



Charles S. Swartz, Edwin E. Catmull, Robin King, Richard Weinberg, Jane Veeder

August 1997 **Proceedings of the 24th annual conference on Computer graphics and interactive techniques**

Publisher: ACM Press/Addison-Wesley Publishing Co.

Full text available: [pdf\(450.02 KB\)](#)

Additional Information: [full citation](#)

3 [Proceedings of the 1992 symposium on Interactive 3D graphics](#)



Marc Levoy, Edwin E. Catmull, David Zeltzer

June 1992 proceeding

Publisher: ACM Press

Additional Information: [full citation](#), [index terms](#)

4 [An analytic visible surface algorithm for independent pixel processing](#)



Edwin Catmull

January 1984

ACM SIGGRAPH Computer Graphics , Proceedings of the 11th annual conference on Computer graphics and interactive techniques SIGGRAPH '84, Volume 18 Issue 3

Publisher: ACM Press

Full text available: [pdf\(542.93 KB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

An algorithm is presented that solves the visible surface problem at each pixel

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valence **vertices** are **extraordinary vertices**. Averaging for triangular surfaces is similar to quadrilateral surfaces. For each **vertex** in the mesh, we ...

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same **vertex**. If any **extraordinary** corner of valence $N > 4$ is ... The B-rep **model** is defined as. **Catmull-Clark** subdivision surfaces, a network of G ...

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Regular and **extraordinary vertices**. - "Regular" **vertices**. Triangle mesh: valence 6 ...

Catmull-Clark regular rules. New **vertex** shown as dot ...

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this variation in curvature around the **extraordinary vertex**. To demonstrate our method we present results for. the **Catmull-Clark** [CC78], 4-8 [Vel01, ...

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vertices connected to this **vertex** by an edge. In the case of **Catmull-Clark**, if the **vertex** valence is not. four the **vertex** is denoted as an **extraordinary** ...

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and the **extraordinary vertex**. Valence (the number of connected **vertices**) of the ... The **Catmull-Clark** scheme was one of the first schemes for the surface ...

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» Key

IEEE JNL IEEE Journal or Magazine

IEEE JNL IEEE Journal or Magazine

IEEE CNF IEEE Conference Proceeding

IEEE CNF IEEE Conference Proceeding

IEEE STD IEEE Standard

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- ☐ **1. Dynamic Catmull-Clark subdivision surfaces**
 Hong Qin; Mandal, C.; Vemuri, B.C.;
[Visualization and Computer Graphics, IEEE Transactions on](#)
 Volume 4, Issue 3, July-Sept. 1998 Page(s):215 - 229
 Digital Object Identifier 10.1109/2945.722296
[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(1428 KB) IEEE JNL
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- ☐ **2. Polygonal decomposition of the 1-ring neighborhood of the Catmull-Clark**
 Ivriissimtzis, I.P.; Zayer, R.; Seidel, H.-R.;
[Shape Modeling Applications, 2004. Proceedings](#)
 2004 Page(s):101 - 109
 Digital Object Identifier 10.1109/SMI.2004.1314497
[AbstractPlus](#) | Full Text: [PDF](#)(489 KB) IEEE CNF
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- ☐ **3. Turning the approximating Catmull-Clark subdivision scheme into a local surface modeling tool**
 Claes, J.; Beets, K.; van Reeth, F.; Iones, A.; Krupkin, A.;
[Shape Modeling and Applications, SMI 2001 International Conference on](#)
 7-11 May 2001 Page(s):42 - 48
 Digital Object Identifier 10.1109/SMA.2001.923374
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- ☐ **4. Interpolation over arbitrary topology meshes using a two-phase subdivis**
 Zheng, J.; Cai, Y.;
[Visualization and Computer Graphics, IEEE Transactions on](#)
 Volume 12, Issue 3, May-June 2006 Page(s):301 - 310
 Digital Object Identifier 10.1109/TVCG.2006.49
[AbstractPlus](#) | Full Text: [PDF](#)(1640 KB) IEEE JNL
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- ☐ **5. And the Oscar goes to ... [computer graphics]**
 Perry, T.S.;
[Spectrum, IEEE](#)
 Volume 38, Issue 4, April 2001 Page(s):42 - 49
 Digital Object Identifier 10.1109/6.915188

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Subdivision surfaces were introduced in 1978 by both. **Catmull-Clark** [1] and Doo-Sabin [2] ... except at **extraordinary vertices** where the surface is only ...
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at the **vertex**) other than four for **Catmull-Clark** and Doo-. Sabin schemes. [8,. 131.) In addition, **extraordinary vertices**. can create surface ripples. ...
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1 [Non-uniform recursive subdivision surfaces](#)



Thomas W. Sederberg, Jianmin Zheng, David Sewell, Malcolm Sabin

July 1998 **Proceedings of the 25th annual conference on Computer graphics and interactive techniques**

Publisher: ACM Press

Full text available: [pdf\(1.45 MB\)](#)

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Keywords: B-splines, Catmull-Clark surfaces, Doo-Sabin surfaces

2 [Approximation & refinement: Data-dependent fairing of subdivision surfaces](#)



Ilja Friedel, Patrick Mullen, Peter Schröder

June 2003 **Proceedings of the eighth ACM symposium on Solid modeling and applications**

Publisher: ACM Press

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In this paper we present a new algorithm for solving the data dependent fairing problem for subdivision surfaces, using Catmull-Clark surfaces as an example. Earlier approaches to subdivision surface fairing encountered problems with singularities in the parametrization of the surface. We address these issues through the use of the characteristic map parametrization, leading to well defined membrane and bending energies even at irregular vertices. Combining this approach with ideas from data-dep ...

Keywords: CAD, Catmull-Clark, bicubic b-splines, fairing, geometric modeling, nonlinear minimization, subdivision surfaces, thinplate energy

3 [Exact evaluation of Catmull-Clark subdivision surfaces at arbitrary parameter values](#)



Jos Stam

July 1998 **Proceedings of the 25th annual conference on Computer graphics and interactive techniques**

Publisher: ACM Press

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bic patches assigned to each **extraordinary vertex** of the initial mesh). Each normal element is a bicubic surface patch and, hence dened by 16 **vertices** ...

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ties of traditional spline based model settings. **Subdivision** methods ... we will refer to it as an **extraordinary patch**. Properties such as po- ...

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For an **extraordinary vertex**, an n-sided quadratic. Zheng-Ball patch will be ... from vertex V. Boundary mesh **subdivision** for **vertices** of valence > 3. ...

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Gabriel Taubin

September 1995 **Proceedings of the 22nd annual conference on Computer graphics and interactive techniques**

Publisher: ACM Press

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D **Zorin**, P Schröder, W Sweldens - Proceedings of the 23rd annual conference on Computer ... , 1996 - portal.acm.org

... Nasri [17] presents such a modification for the Doo-Sabin scheme, while Halstead et al. [11] do the same for the **Catmull-Clark** scheme. ...

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... Jos Stam, Exact evaluation of **Catmull-Clark** subdivision surfaces at arbitrary parameter values, Proceedings of the 25th annual conference on Computer graphics ...

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L Velho, D **Zorin** - Computer Aided Geometric Design, 2001 - Elsevier

... gives rise to the Loop subdivision scheme, and tensor product biquadratic and bicubic splines lead to Doo-Sabin and **Catmull-Clark** subdivision respectively ...

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D **Zorin**, P Schröder - Computer Aided Geometric Design, 2001 - Elsevier

... respectively vertices. The scheme of **Catmull-Clark** is an example of the former, while the Doo-Sabin scheme exemplifies the latter. In ...

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D **Zorin** - Constructive Approximation, 2000 - Springer

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